



Connecticut River Watch Program

HOCKANUM RIVER RAPID BIOASSESSMENT SUMMARY REPORT



Funded in part by the CT DEP through a US EPA Clean Water Act §319 nonpoint source grant



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Hockanum River Rapid Bioassessment Summary Report
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INTRODUCTION

During the fall of 2004 the Connecticut River Watch Program (CRWP), in cooperation with the Hockanum River watershed stakeholder groups and the Connecticut Department of Environmental Protection (DEP), conducted a rapid bioassessment of the Tankerhoosen River. Teams of volunteers, including riparian landowners, land use commissioners, members of the Hockanum River Watershed Association and the Hockanum River Linear Park Committee, a science teacher from Rockville High School, and members of the community assisted with the bioassessment, a survey of the benthic macroinvertebrate community following the DEP protocol: *Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors*.

The monitoring project was the fifth component of an effort to assess the health of the Hockanum River begun in 1999. The study began with a physical survey of the Hockanum River, and continued in 2000 with a physical survey of the Tankerhoosen River. In 2002, the first bioassessment of the Hockanum and Tankerhoosen Rivers was conducted, and in 2003 a bioassessment focusing on the Tankerhoosen was undertaken. It is our hope that the effort will evolve into a long-term community-based monitoring and assessment program, designed to help insure the improvement and protection of this valuable resource.

Goals of the monitoring program include: to collect baseline information about the condition of the Hockanum River and its tributaries; to identify areas of the river in need of protection or restoration; and to raise community awareness of the River and the need to restore and protect it. Information collected will be used to identify, plan and prioritize conservation and improvement efforts. The CRWP monitoring program is intended to complement and build upon ongoing efforts to improve conditions in the watershed and raise public awareness of the river.

BACKGROUND

The Hockanum River Watershed

The Hockanum River is a major tributary of the Connecticut River located in north central Connecticut. From its beginnings in Shenipsit Lake in Ellington, the Hockanum flows approximately twenty-five (25) miles to its confluence with the Connecticut River in East Hartford. The River's watershed comprises a seventy-seven (77) square mile area draining large portions of Ellington, Tolland, Vernon and Manchester, and smaller portions of Somers, Stafford, Bolton and East Hartford. While areas of the watershed are undeveloped, the Hockanum flows through an increasingly urbanized landscape as it travels downstream. The River also assimilates waste from three sewage treatment plants.

The Hockanum River is included in Connecticut's Unified Watershed Assessment as a category 1 (impaired) watershed, and was recommended for monitoring/assessment by the



Department of Environmental Protection (DEP) ambient monitoring group. The River is on DEP's list of impaired waters (Vernon to Mouth), with impairments listed as aquatic life support, contact recreation/bacteria, and inadequate fish passage. Suspected causes of these water quality impairments include agriculture, landfills, highway maintenance and runoff, urban runoff and wet weather discharges. Shenipsit Lake is also included on the list due to flow modification from public water supply diversion.

Despite its water quality problems, the Hockanum River is a well-used recreational resource. An annual spring canoe race brings many enthusiasts to the river. The Hockanum River Linear Park not only protects areas of the river and riparian habitats, but also contains a network of riverside hiking trails. The trails provide casual hikers the opportunity to enjoy the natural beauty of the river, even in some bustling commercial areas. Further, the presence and use of the Linear Trail helps to promote stewardship of the river.

Hockanum River Restoration Efforts

The Hockanum River has been the focus of a number of local and regional efforts to improve its health. In 1995, the Tolland and Hartford County Soil and Water Conservation Districts (now the North Central Conservation District) initiated a watershed management project with funding from the DEP through a grant from the US Environmental Protection Agency (EPA) under Section 319 of the Clean Water Act. Activities undertaken as part of this project have focused on identifying and reducing pollution problems associated with storm water runoff, and restoring fish and wildlife habitat.

Five different restoration and stabilization projects in the Hockanum River and tributaries have been funded through the DEP River Restoration Grant program, one in East Hartford, two in Vernon, and two in Manchester. In addition, last year the DEP conducted intensive water quality monitoring on the river under their TMDL (Total Maximum Daily Load) program.

The Hockanum River Watershed Association (HRWA), North Central Conservation District, and The Friends of the Hockanum River Linear Park of Vernon sponsor outreach and education activities such as annual river clean-ups, hikes, and nature walks, and town based Hockanum River Linear Park committees in Manchester and Vernon create and maintain a network of trails.

About the Hockanum River Study

The Connecticut River Watch Program is working in conjunction with the Hockanum River Watershed Association (HRWA) and the North Central Conservation District to develop and support a community-based river monitoring and assessment program in the Hockanum River watershed. This effort is part of the expanded Connecticut River Watch Program, and is one the new watershed monitoring and assessment programs initiated in 1999 as part of this new basin-wide program.

The Hockanum River is included in Connecticut's Unified Watershed Assessment as a category 1 (impaired) watershed, and was recommended for monitoring/assessment by the Department of Environmental Protection (DEP) ambient monitoring group. The CRWP monitoring program is intended to complement and enhance existing efforts to improve conditions in the watershed and raise public awareness of the river by the HRWA, the Linear Park committees, the North Central Conservation District, and the watershed municipalities. Improvements have been implemented as part of a watershed management project funded by the DEP through a U.S. Environmental Protection Agency §319 nonpoint source grant watershed project. In 1998, CRWP was asked by the DEP and EPA to help develop a volunteer monitoring program in conjunction with the watershed project.

The study began in 1999 with a Stream Walk Survey—a survey of physical characteristics—of the Hockanum River main stem, and continued in 2000 with a similar survey of the Tankerhoosen River, the Hockanum’s major tributary. The surveys were conducted with assistance from members of the Hockanum River Watershed Association and the watershed community.

A number of management considerations were raised by the surveys. In the Hockanum, much of the river appeared to be impacted adversely by human development as evidenced by inadequate stream buffers, adjacent residential, commercial and industrial development, non-native invasive plants, yard waste, algae growth, exposed streambank soils, and sedimentation. At the same time, in areas protected by the Hockanum River Linear Park, the river seems to support a diversity of wildlife, as well as provide many opportunities for public access and recreation. In the Tankerhoosen, similar problems were uncovered, though several areas of the river appear to be in relatively good condition, both upstream and downstream. Also, there are very few areas where stream buffers are less than 25 feet and where there are lawns adjacent to the stream. Further, numerous opportunities for recreational access and use were identified in the survey; development and use of new access areas will help to heighten awareness of the river’s values and promote stewardship activities. Recommendations included addressing concerns and threats identified by the stream surveys, completing the collection of baseline information by surveying other streams in the watershed, and conducting additional river monitoring activities to assess in-stream health.¹

In 2002 and 2003, macroinvertebrate assessments were undertaken using the Connecticut DEP Rapid Bioassessment for Volunteers (RBV) protocol. The studies were planned and conducted with assistance from the Vernon Linear Park Committee and the Hockanum River Watershed Association. The focus of both assessments was the Tankerhoosen River. In 2002 Hockanum River sites were also included, and in 2003, a site on Gages Brook, a small tributary of the Tankerhoosen, was included. Results of both studies revealed general upstream-downstream declines in the percent contribution of sensitive organisms at the sites, pointing toward a possible decline in water quality. Recommendations included conducting a Rapid Bioassessment on an annual basis.²

The Connecticut River Watch Program

The Connecticut River Watch Program (CRWP) is a volunteer water quality monitoring, protection and improvement program for the Connecticut River and tributaries. CRWP is sponsored by the Connecticut River Coastal Conservation District, and was initiated in 1992 in cooperation with the River Watch Network (now part of the national River Network). The program is designed to meet two major objectives: build awareness about river resources and water quality, and collect scientifically credible data to use to identify and address water quality problems. Working with local collaborators, CRWP now supports monitoring programs in five regional watersheds. CRWP has become a model program, with wide support from local communities and state and federal environmental officials. Funding for CRWP has come primarily from the Connecticut DEP through US EPA grants under Section 319 of the Clean Water Act.

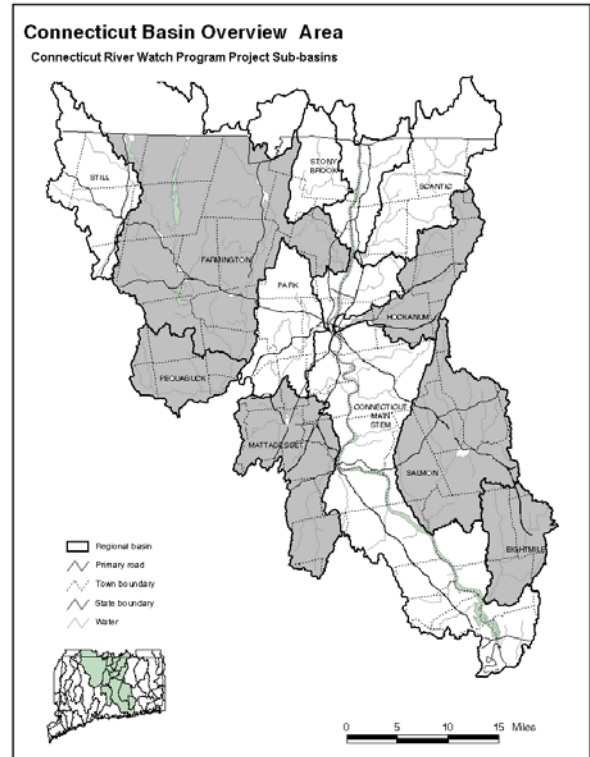
¹ Additional information about the surveys, including data summaries, can be found in the *Hockanum River Stream Walk Summary Report* (May 2000), and *Tankerhoosen River Stream Walk Summary Report* (September 2001), both published by the Middlesex County Soil and Water Conservation District.

² Additional information about the rapid bioassessments, including data summaries, can be found in the *Hockanum River Rapid Bioassessment Summary Report*, published by the Middlesex County Soil and Water Conservation District in December 2002, and the *Hockanum River Rapid Bioassessment Summary Report*, published by the Connecticut River Coastal Conservation District in May 2004.

From 1992-1998 monitoring activities were focused on the lower Connecticut River main stem and the Mattabeset/Coginchaug tributary basin. The program generated an extensive water quality database, and raised local awareness of river resources and water quality. Information collected through CRWP was used by municipalities to investigate potential sources of pollution, by the state for planning purposes, and in developing a comprehensive management plan for the Mattabeset watershed.

In 1999, CRWP expanded into new watersheds within the Connecticut River basin. A regional support service, the program initiates, supports and coordinates community-based river monitoring, assessment and improvement programs in regional watersheds throughout the basin. CRWP continues to put water quality and physical survey information into the hands of local communities, and support efforts to use that information to direct river and other watershed protection and improvement efforts.

Current project areas include the Mattabeset/Coginchaug, Eightmile, Salmon, Hockanum and Farmington River watersheds.



PROJECT SUMMARY

Goals

The Hockanum River Rapid Bioassessment was undertaken as part of an ongoing community-based effort to document the health of the Hockanum River watershed. Based on local input, it was decided that a rapid bioassessment of the Tankerhoosen River would be the focus of this fifth year's effort.

The overall goals include:

- ◆ Develop a baseline of information about the condition of the Hockanum River and tributaries
- ◆ Identify areas of concern and potential pollution problems that can be used to plan conservation and improvement efforts
- ◆ Raise public interest in and knowledge of the Hockanum River, both about the resources it has to offer and the problems it faces
- ◆ Develop public awareness of water quality issues and human impacts on our rivers
- ◆ Build on the existing local constituency for the Hockanum River and expand the base of active volunteers
- ◆ Form the basis for more complex water quality monitoring activities that can be pursued in future years according to needs, level of interest, ability to commit time, and the availability of other resources

Study Design and Methodology

The DEP's Rapid Bioassessment in Wadeable Streams and Rivers by Volunteer Monitors (RBV) is a benthic macroinvertebrate assessment protocol designed specifically for volunteer programs. Benthic macroinvertebrates are bottom dwelling aquatic organisms that can be seen with the unaided eye, such as stonefly, mayfly and caddisfly nymphs. They are good indicators of water quality for several reasons: many are sensitive to pollution, the composition of the community is a good reflection of long-term water quality (since they live there year-round), they cannot easily escape pollution, and they are relatively easy to collect. In addition, there are many established methods for using macroinvertebrate data to assess water quality and stream health. Benthic macroinvertebrates are collected from shallow riffle areas by disturbing the stream bottom and catching the dislodged organisms in a net. The DEP uses the riffle-dwelling benthic macroinvertebrate community as the primary indicator of biological integrity of freshwater streams.

The RBV protocol is designed to help identify streams with pollution sensitive benthic macroinvertebrate communities. It is not a definitive assessment procedure; data are used primarily for screening purposes, to identify streams with either very high or very poor water quality. There are twenty-six organisms included in the RBV protocol (see list, Attachment A). They are easily identified due to their distinct shape, structure, color, or behavior. Each also provides key ecological information about the stream environment. RBV organisms are categorized in one of three groups:

- ◆ *Most Wanted* – The most sensitive to pollution, requiring a narrow range of environmental conditions. When abundant they are a sign of a non-impaired stream;
- ◆ *Moderately Wanted* – Less sensitive to pollution and found in a variety of water quality conditions. When abundant, more information is needed about upstream conditions to infer water quality;

- ◆ *Least Wanted* – Least sensitive to pollution and tolerant of the widest range of conditions. When they make up the majority of a sample, they indicate some level of water quality impairment.

RBVs are generally scheduled to take place in the fall, during October and November, to document the condition of the macroinvertebrate community following the summer, a “high stress” time for streams due to low flows and higher water temperatures.

Volunteers receive training in the RBV protocol in an indoor training session prior to conducting the assessment. Sampling and analysis equipment and supplies, as well as reference materials to aid in identification of organisms, are provided by the DEP. Benthic macroinvertebrates are collected using a large flat-bottom net 12” high X 18” wide with a mesh size no larger than a #30 sieve (0.59 mm). Volunteers collect three replicate samples, each consisting of two one square meter collections or “kicks”, sort and identify the organisms in the field, and document relative abundance of key organisms on official field data sheets for the RBV protocol (see Attachment B). Volunteers also keep a representative voucher collection consisting of at least one of each type of organism found, preserved in 91% isopropyl alcohol. The voucher collection is returned to the DEP along with the data sheets.³

Four sites were identified for inclusion in the study. Sites were selected to provide an in-depth upstream-downstream assessment of the Tankerhoosen River (see site map, Attachment C), as well as an assessment of Tankerhoosen tributary Gages Brook. As indicated in the table below, several of the sites are also DEP monitoring sites, last sampled as part of the 1998-1999 Connecticut River basin survey.

Table 1. Tankerhoosen River RBV Sites (listed upstream to downstream by river)

Site #	River	Location	Rationale
HR7b	Tankerhoosen R.	Bolton Road in Vernon (downstream)	Upstream site; control site for watershed
HR7a (DEP)	Tankerhoosen R.	Tunnel Road in Vernon (upstream)	Mid-stream site; downstream of agriculture
HR7 (DEP)	Tankerhoosen R.	Golfland, near confluence with Hockanum R. (100 meters upstream)	Downstream site; integrator site for nonpoint sources
HR7d	Gages Brook	Behind the Tolland Agricultural Center, at the footbridge on the walking trail	Impacts of Interstate 84 and upstream development in the Tolland Industrial Park

³ DEP website: <http://dep.state.ct.us/wtr/volunmon/volopp.htm>

Volunteer Recruitment, Training and Participation

A recruitment flyer was sent to all Hockanum CRWP volunteers, and Hockanum River Watershed Association and Linear Park Committee members. Notices were also sent to the local newspapers. Fourteen people attended the training session, held on October 2, 2004 at the Tolland Agricultural Center in Vernon. The agenda included an introduction to local Hockanum River protection and improvement efforts; an introduction to the Connecticut River Watch Program and Hockanum River Study; and a training presentation on the DEP RBV protocol.

Following the indoor training session, volunteers were grouped into four teams and assigned a specific river site. Each team was provided with sampling and analysis equipment and supplies: a kicknet, gloves, white plastic trays, forceps, hand lenses, ice cube trays (for sorting), field identification cards, a data sheet, and a vial filled with 91% isopropyl alcohol for the voucher collection. Maps were also provided showing the location of each sample site. Volunteers were also requested to complete a site sheet to document stream habitat characteristics, including river bottom composition, water depth and width, current velocity, and stream shading (not part of the RBV protocol).



Teams proceeded to their sites to complete their fieldwork. They first identified three different locations in the riffle where samples would be collected, then collected, sorted and identified organisms from each of the three samples. Relative abundance of each RBV organism was recorded on the RBV data sheet, and at least one of each type of organism found was placed in the vial filled with alcohol for the voucher collection. District/CRWP staff circulated between the sites to assist the volunteer teams.

After completing their fieldwork, volunteers reconvened at the Tolland Agricultural Center to turn in their data sheets, voucher collections, and equipment and supplies.



SURVEY RESULTS

RBV data sheets were reviewed and voucher collections examined by the DEP Volunteer Monitoring Coordinator. A list of all organisms included in the voucher collection was generated for each sample site, and an overall assessment of the health of the river was made based on the data collected.⁴ Rapid bioassessment results are summarized in a table format (Attachment D). The table includes information about RBV organisms, as well as additional organisms that were included in the voucher collections.

The RBV data vary considerably by site. At the Gages Brook and Tankerhoosen Tunnel Road sites, data show good representation among organisms from *most wanted* and *moderately wanted* categories, while at the Tankerhoosen Bolton Road site and the Tankerhoosen Golfland site, data show good representation among organisms from *moderately wanted* and *least wanted* categories. As seen in Table 2 below, the best representation of *most wanted* organisms was found at the Gages Brook and Tankerhoosen Tunnel Road sites, with 3 (43% and 60%, respectively) of the organisms in this category. Only one *most wanted* organism was found at each of the other two Tankerhoosen sites (Bolton Road, 14%; Golfland, 12.5%). At the Golfland site, the most downstream Tankerhoosen site, 37.5% of the organisms found were in the *least wanted* category, the highest percentage in this category of the Hockanum watershed sites, indicating potential impacts at this site. *Moderately wanted* organisms were the most commonly collected organisms, overall.

Table 2. Occurrence of different types of organisms in each RBV category by site and as compared with a high quality reference site. Good representation (3 or more) of organisms in the *most wanted* category—the most sensitive to pollution—is an indicator of very good water quality. Sites with 5 or more organisms in the *most wanted* category are considered by DEP to have reference conditions and in full support of the standards for aquatic life.⁵

Site #	River	Location	Most	Moderate	Least	Total #
HR7d	Gages Brook	Behind TAC at footbridge in Vernon	43% (3)	57% (4)	0% (0)	7
HR7b	Tankerhoosen R.	Bolton Road in Vernon	14% (1)	72% (5)	14% (1)	7
HR7a	Tankerhoosen R.	Tunnel Road in Vernon	60% (3)	40% (2)	0% (0)	5
HR7	Tankerhoosen R.	Golfland, near confluence with Hockanum R.	12.5% (1)	50% (4)	37.5% (3)	8
NA	REFERENCE ⁶	Compilation of high quality sites	47% (7)	40% (6)	13% (2)	15

The most commonly collected organisms (found in at least three of the four sites) were:

- ◆ Perlidae (Panel 5 – Common Stonefly – Most);
- ◆ Hydropsychidae (Panel 9 – Common Netspinner Caddisfly - Moderate);
- ◆ *Chimarra* (Panel 10 – Fingernet Caddisfly – Moderate);
- ◆ *Stenonema* (Panel 11 – Flat-head Mayfly – Moderate);

In general, streams with representation from all RBV categories indicate good water quality.⁷ Though none of the Hockanum watershed sites have good representation from all categories, based on the

⁴ According to the RBV protocol, only organisms in the voucher collection can be confirmed as present at the site.

⁵ Personal communication with Mike Beauchene, CT DEP, April 1, 2004

⁶ Reference statistics compiled and provided by Mike Beauchene, CT DEP, based on DEP collected data from high quality streams around the state, including the Natchaug River, Eightmile River, Sandy Brook, Salmon River, Saugatuck River, Green Fall River and Whitford Brook. Median percentages for each category are reported here.

⁷ Written communication from Mike Beauchene, CT DEP, November 2002.

numbers of *most wanted* organisms found at the Gages Brook and Tankerhoosen Tunnel Road sites, one can infer that these sites have very good water quality. The more limited number of *most wanted* organisms at the other two sites may indicate degraded water quality, though additional assessment would be necessary to determine whether this is the case. It is important to note, however, that only organisms preserved in the voucher collection can be confirmed as present at the site. According to the data recorded by volunteers, there were some types of *most wanted* organisms found at all sites but the Gages Brook site that were not in the vials. At the Bolton Road site three types were missing from the vial; at the Tunnel Road site two types were missing; and at the Golfland site, one missing. Either these organisms were misidentified, or some types were mistakenly not included in the voucher collections.

Included in the voucher collections were six additional (non-RBV) organisms. One had a tolerance value of 1 (*most wanted* in RBV terms); three had a tolerance value of 4 (*moderately wanted* in RBV terms); and the remaining two had a tolerance value of 6 (*least wanted* in RBV terms).

Differences between the results at the four sites are likely not significant, with the possible exception of the lower number of *most wanted* organisms at the Bolton Road and downstream Tankerhoosen sites; the higher percentage of *least wanted* organisms at the downstream Tankerhoosen site noted above, and; total diversity. As shown in Table 3, diversity (the number of different types of organisms found) varies between a high of 11 at the Golfland Tankerhoosen site, and a low of 8 at the Tunnel Road Tankerhoosen site.⁸ These differences in results may be due to sampling and observation techniques, as well as the level of care taken in ensuring that all types of organisms identified were included in the voucher collection; future rapid bioassessments will help determine whether they reflect actual differences in the benthic macroinvertebrate communities.

Table 3. Occurrence of different types of RBV and non-RBV organisms by site, with total diversity for each site (listed upstream to downstream by river)

Site #	River	Location	RBV #	Non RBV #	Total #
HR7d	Gages Brook	Behind TAC at footbridge in Vernon	7	2	9
HR7b	Tankerhoosen R.	Bolton Road in Vernon	7	2	9
HR7a	Tankerhoosen R.	Tunnel Road in Vernon	5	3	8
HR7	Tankerhoosen R.	Golfland, near confluence with Hockanum R.	8	3	11

The Hockanum RBV results are average (3 *most wanted* organisms) and below average (1 *most wanted* organism) when compared with similar volunteer bioassessments done at 55 sites around the state. As shown in the 2004 RBV summary report, *Rapid Bioassessment in Wadeable Streams and Rivers By Volunteer Monitors-2004 Summary Report*, 5 *most wanted* organisms were found at only 4 out of the 55 sites (7%) assessed by volunteers in 2004; sites with 3 *most wanted* organisms were the most common (18 or 33%); and sites with 1 or 2 *most wanted* organisms followed (11 each, or 20%).

According to the report, the DEP is confident that sites with five or more *most wanted* organisms are in full support of the state water quality standards for aquatic life. Sites that have fewer than 4 *most wanted* organisms do not definitively indicate impairment or degradation. In these cases, the DEP recommends

⁸ In general terms, the greater the number, the healthier the community.

that they conduct additional assessment to verify species present, determine possible impacts of upstream land use characteristics, and evaluate the possibility of errors in conducting the RBV.⁹

Though it is of interest to compare RBV results from around the state, it is important to qualify these comparisons due to the inherent variability between volunteer groups and their application of the RBV protocol. There are many places in the procedure where level of experience, effort and attention to detail could affect results—while sampling, picking organisms from the tray, sorting and identifying, and transferring organisms to the vials for preservation. Weather conditions can also affect results.

While the presence of 5 or more *most wanted* organisms indicates a reference quality stream according to the DEP, the fact that fewer than 5 are found does not necessarily mean that the stream does not also have reference conditions, just that the additional *most wanted* organisms were not documented by volunteers using the RBV protocol. It is important to bear in mind that the RBV protocol is intended to be a screening tool, not a definitive assessment method.

As seen in Tables 4 and 5 below, when comparing results from 2002, 2003 and 2004 at sites assessed in both years, a general decrease can be seen in numbers of *most wanted* organisms and RBV organisms overall, a possible sign of a decline in water quality. While these changes may be significant, they are more likely due to differences in sampling, observation and preservation techniques, perhaps related to the make-up of teams and level of experience of team members. Future assessments will help determine whether these are in fact real trends.

Table 4. Comparison of 2002, 2003 and 2004 *Most Wanted* RBV organisms by site (listed upstream to downstream)

Site #	River	Location	Most Wanted RBV #		
			'02	'03	'04
HR7d	Gages Brook	Behind TAC at footbridge in Vernon	NA	6	3
HR7b	Tankerhoosen R.	Bolton Road in Vernon	6	4	1
HR7a	Tankerhoosen R.	Tunnel Road in Vernon	8	5	3
HR7	Tankerhoosen R.	Golfland, near confluence with Hockanum R.	2	4	1

Table 5. Comparison of 2002, 2003 and 2004 RBV and non-RBV organisms by site, with total diversity for each site (listed upstream to downstream)

Site #	River	Location	RBV #			Non RBV #			Total #		
			'02	'03	'04	'02	'03	'04	'02	'03	'04
HR7d	Gages Brook	Behind TAC at footbridge in Vernon	NA	12	7	NA	3	2	NA	15	9
HR7b	Tankerhoosen R.	Bolton Road in Vernon	12	10	7	0	2	2	12	12	9
HR7a	Tankerhoosen R.	Tunnel Road in Vernon	17	12	5	2	5	3	19	17	8
HR7	Tankerhoosen R.	Golfland, near confluence with Hockanum R.	13	13	8	3	3	3	16	16	11

⁹ The RBV report is available on DEP's website, <http://dep.state.ct.us/wtr/volunmon/04rbvsum.pdf>

RECOMMENDATIONS

The information collected from the 2004 Rapid Biological Assessment provides a baseline against which we can measure future changes, and also points to the need to conduct additional monitoring to refine results and validate conclusions. Overall the results of the assessment are mixed, and indicate a possible decline at sites in comparisons of the 2002, 2003 and 2004 results. These, coupled with threats to the Rivers' health identified in the stream walk surveys conducted in 1999 and 2000, point toward the need for river improvement and protection projects (some of which are underway). If these concerns and threats are not addressed in a timely way, water quality may be affected. Continued monitoring will help to assess changes in water quality over time, and document improvements resulting from ongoing management and restoration activities.

As a follow-up to this year's monitoring effort in the Hockanum River watershed, general recommendations include:

- ◆ Conduct a Rapid Biological Assessment on an annual basis;
- ◆ Continue the collection of baseline information by conducting physical surveys of additional streams in the watershed;
- ◆ Follow up on stream walk survey data collected, as recommended in the 1999 and 2000 stream walk summary reports;
- ◆ Conduct additional river monitoring activities to assess in-stream health, including additional benthic macroinvertebrate surveys, and analysis of water samples for chemical, physical and biological indicators of water quality;
- ◆ Monitor river segments periodically to assess conditions. This could be accomplished through a stream segment adoption program whereby volunteers make visual observations on an annual basis and file a written status report.

For assistance and further information, please contact:

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ACKNOWLEDGEMENTS

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Ed Dresner	Jane Seymour
Roland Duprey	Sarah Smith
Suzanne Freniere	Jessica Teslof
Ginny Gingras	Sandy Yamarik
Bob Gustafson	

Cooperating Organizations, Businesses and Municipalities

The Friends of the Hockanum River Linear Park of Vernon, Inc.: Special thanks to *Ann Letendre*, who helped schedule the bioassessment activity, made arrangements for the training facility, publicized the event and recruited volunteers, provided local input in the study design, and participated in the assessment.

Hockanum River Watershed Association: Special thanks in particular to member *George Arthur*, for assistance in performing the assessment.

North Central Conservation District: Special thanks to *David Askew, Barbara Kelly and Ruth Klue*, who assisted in publicizing and recruiting volunteers for the bioassessment.

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This project was funded in part by the Connecticut Department of Environmental Protection through a US Environmental Protection Agency Clean Water Act §319 non-point source grant.

Attachments

A – RBV Organism List

B – RBV Field Data Sheet

C – Site Map

D – Data Summary







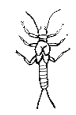





Attachment A – RBV Organism List








Rapid Bioassessment for Volunteers – Organism List








RBV Panel #	Genus	Family	Order	Common Name	RBV Category	Tolerance Value
1	<i>Drunella</i>	Ephemerellidae	Ephemeroptera	Body-Builder Mayfly	MOST	0
2	<i>Isonychia</i>	Isonychidae	Ephemeroptera	Minnow Mayfly		2
3	<i>Epeorus</i>	Heptageniidae	Ephemeroptera	Flat-headed Mayfly		0
4		Peltoperlidae	Plecoptera	Roach-like Stonefly		0
5		Perlidae	Plecoptera	Common Stonefly		1
5	<i>Pteronarcys</i>	Pteronarcyidae	Plecoptera	Giant Stonefly		0
5		Miscellaneous	Plecoptera	Stonefly		1
6	<i>Apatania</i>	Limnephilidae	Trichoptera	Cornucopia Case Maker		0
6	<i>Glossosoma</i>	Glossomatidae	Trichoptera	Mini-stone Case Maker		0
6	<i>Rhyacophila</i>	Rhyacophilidae	Trichoptera	Michelin-Man Caddisfly		0
8	<i>Brachycentrus</i>	Brachycentridae	Trichoptera	Mid-size Plant Case Builder		1
8	<i>Lepidostoma</i>	Lepidostomatidae	Trichoptera	Mid-size Plant Case Builder		1
9		Hydropsychidae	Trichoptera	Common Netspinner	MODERATE	4
10	<i>Chimarra</i>	Philopotamidae	Trichoptera	Fingernet Caddisfly		3
11	<i>Stenonema</i>	Heptageniidae	Ephemeroptera	Flat-headed Mayfly		4
12	<i>Psephenus</i>	Psephenidae	Coleoptera	Water Penny Beetle Larva		4
13	<i>Corydalus</i>	Corydalidae	Megaloptera	Dobsonfly Larva		6
13	<i>Nigronia</i>	Corydalidae	Megaloptera	Fishfly Larva		4
14		Aeshnidae Gomphidae Coenagrionidae	Odonata	Dragonfly, Damselfly Nymphs		3
15		Amphipod	Amphipoda	Scud	LEAST	8
15			Oligochaeta	Aquatic Earth Worm		9
15		Isopod	Isopoda	Sowbug		8
15		Simuliidae	Diptera	Black Fly Larva		6
15			Hirudinea	Leech		8
15		Chironomidae	Diptera	Midge Fly Larva		6
15			Gastropoda	Snail		7

Attachment B – RBV Field Data Sheet

Stream Name:	Site number:	Collection Date:	Collection Time:
Collection Location (up or downstream of a permanent landmark):			Town:
Approximate stream width:	Approximate stream depth:	Collectors	
Comment or observation about the general condition of the stream:			

Panel number Name	1	2	3	4	5	5	5	6	6	7	8	8
	Drunella	Isonychia	Epeorus	Peltoperlidae	Perlidae	Pteronarcys	Stonefly	Glossosoma	Apatania	Rhyacophila	Brachycentrus	Lepidostoma
												
Kicks 1-2												
Kicks 3-4												
Kicks 5-6												
Total for Site												

Panel number Name	9	10	11	12	13	13	14
	Hydropsychidae	Chimarra	Stenonema	Psephenus	Corydalus	Nigronia	Odonata
							
Kicks 1-2							
Kicks 3-4							
Kicks 5-6							
Total for Site							

Panel number Name	15	15	15	15	15	15	15
	Amphipod	Isonpod	Leech	Midge	Simuliidae	Snail	Worm
							
Kicks 1-2							
Kicks 3-4							
Kicks 5-6							
Total for Site							

Most Wanted

Moderately Wanted

Least Wanted

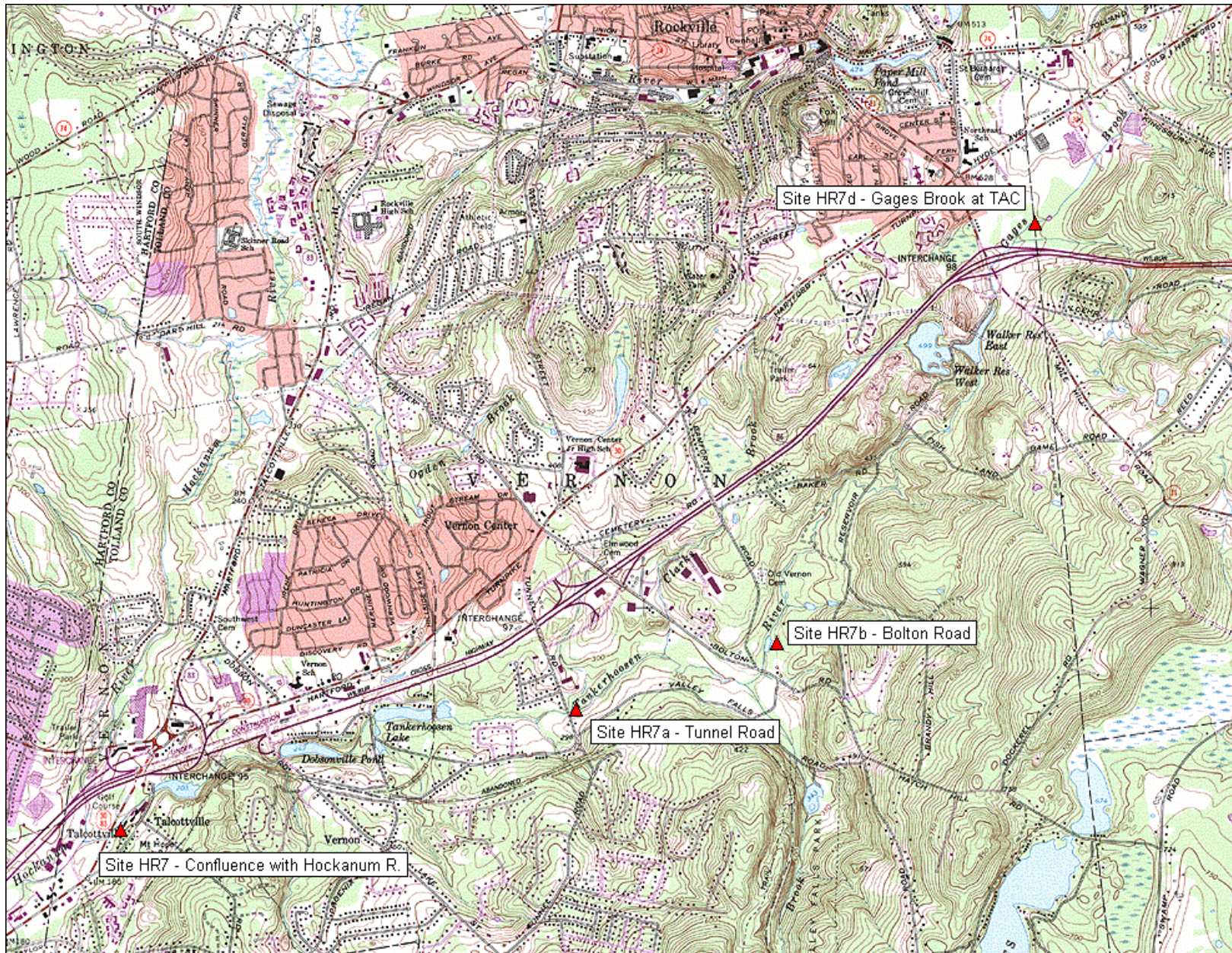
Instructions:

- 1 Record few, some, or many for each of the types of organisms you collected during kicks 1&2, 3&4, 5&6, and total for the site. **FEW, SOME, & MANY are based upon the abundances of each type of organism in this sample only.**
- 2 Place 1 of each type of organism you identified into a vial containing isopropyl alcohol.
- 3 Place a pencil written label into the vial. Include, stream name, date of collection, collectors, and location of collection.
- 4 Submit the vial and datasheet to:

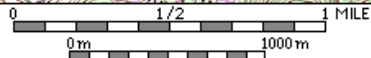
Mike Beauchene
 (860) 424-4185
 mike.beauchene@po.state.ct.us



Attachment C - Site Map



MN
15°
TN



Attachment D – Hockanum River Rapid Bioassessment – Summary of Organism Data from 10/2/04

RBV Panel #	Genus	Family	Order/Class	Common name	RBV Category	Tolerance Value	Gages Brook	Tankerhoosen River		
							Footbridge behind TAC, Vernon	Bolton Rd, Vernon	Tunnel Rd, Vernon	At mouth (Golfland), Vernon
5		Perlidae	Plecoptera	Common Stonefly	MOST	1	some		few	many
5	<i>Pteronarcys</i>	Pteronarcyidae	Plecoptera	Giant Stonefly		0		few	few	
6	<i>Glossosoma</i>	Glossomatidae	Trichoptera	Mini-stone Case Makers		0	many			
7	<i>Ryacophila</i>	Ryacophilidae	Trichoptera	Michelin-man Caddisfly		0	some		few	
9		Hydropsychidae	Trichoptera	Common Netspinner	MODERATE	4	many	some		many
10	<i>Chimarra</i>	Philopotamidae	Trichoptera	Fingernet Caddisfly		3	many	few	many	many
11	<i>Stenonema</i>	Heptageniidae	Ephemeroptera	Flat-head Mayfly		4	few	few		many
12	<i>Psephenus</i>	Psephenidae	Coleoptera	Water Penny Beetle Larva		4			some	some
13	<i>Nigronia</i>	Corydalidae	Megaloptera	Fishfly Larva		4		some		
14		Aeshnidae Gomphidae Coenagrionidae	Odonata	Dragonfly, Damselfly Nymphs	3 ¹	few	some			
15		Isopod	Isopoda	Aquatic Sowbug	LEAST	8				some
15		<i>Amphipod</i>	Amphipoda	Scud		8				some
15		Simuliidae	Diptera	Black Fly Larva		6				few
15			Oligochaeta	Aquatic Earth Worm		9		few		

Additional Organisms In Voucher Collection (not on RBV list)

RBV Panel #	Genus	Family	Order	Common name	RBV Category	Tolerance Value	Gages Brook	Tankerhoosen River		
							Footbridge behind TAC, Vernon	Bolton Rd, Vernon	Tunnel Rd, Vernon	At mouth (Golfland), Vernon
--		Ephemerellidae	Ephemeroptera	Spiny Crawler Mayflies	NA	1		X		
--		Elmidae	Coleoptera	Riffle Beetle Larva		4	X			X
--		Baetidae	Ephemeroptera	Small Minnow Mayfly Larva		4		X	X	X
-	<i>Tipula</i>	Tipulidae	Diptera	Crane Fly Larva		4	X		X	
--		Empididae	Diptera	Dance Fly Larva		6			X	
			Decapoda	Crayfish		6				X

¹ The RBV protocol assigns these organisms an overall tolerance value of 3. The families found have the following tolerance values: Aeshnidae, 3; Gomphidae, 1; Coenagrionidae, 9.